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U. S. Department of Agriculture

THE UNITED STATES DEPARTMENT OF AGRICULTURE

WHAT IT IS
and
HOW IT SERVES

By Dixon Merritt

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THE DEPARTMENT'S BEGINNING.

George Washington, in 1793, was wishing that Congress would do something about establishing a department of agriculture, but believing that it wouldn't. It would be a long time, he said, "before an agricultural society with Congressional aids will be established in this country."

But, while he appraised the temper of Congress pretty accurately, he dared

The to hope that "we may not be so slow in maturation as other
Washington
Wish nations have been." He was right in that, too. Congress never actually got up to the point of establishing a department of agriculture until 1862. And, even then, it was merely what Burns might have termed "a winsome wee thing." But, in half a century, the United States Department of Agriculture did what similar agencies in other countries had not done in three times as long. President Wilson was completely justified by the facts when, in 1917, he called it "the greatest practical

Greatness and scientific agricultural organization in the world." It
Achieved
Rapidly may have been even longer delayed than the father of his country looked for--his ponderous word, "maturation" had long gone out of fashion and "maturing" had succeeded it in word society--but the Washingtonian wish did come true. The United States did the thing in thorough fashion in less time than other nations had taken to the task.

One may well imagine Washington so much interested in the development as to leave, for a while, the golden harps and the grapes of Eschol

and have himself rowed back across the Styx to the vale of tears and trials and Tories, just to see it--this tremendous agricultural agency that the rest of the world can not approach. And yet, most of us who live here with it and are benefited by it every day have not thought enough about it even

Scope to wonder at it or to inquire about it. All of us know, to
Not Fully
Realized be sure, that there is such a thing in Washington, and each little group of us knows that it does some particular thing. Nearly every housewife knows that the Department of Agriculture teaches methods of canning, but she probably never suspects that it inspects nearly every piece of meat that comes on her table and guarantees the purity of every legitimate dose of medicine that she gives her children. Nearly every man knows that the Department of Agriculture sends out some free seeds to people sometimes, but he probably does not know that it has introduced from the far corners of the earth ten thousand new plants, many of which furnish products that are now in daily use on the tables of the Nation, or that its experiments with a cattle tick led to the revelation of the mosquito as the cause of yellow fever and malaria, and made possible the digging of the Panama Canal.

But the only way to tell the story of the Department of Agriculture
Down to is to get down to boot heels and bitulithic--not to mention
Brass
Tacks such common things as bed rock and brass tacks--and talk about the specific things that are done by each of the many bureaus.

ORGANIZATION OF THE DEPARTMENT.

There are more than 21,000 people at work in the Department of Agriculture. Many of them, of course, are clerks and the like, but many of them, on the other hand, are recognized world authorities, each on the

particular subject that he has made his specialty. This story may illustrate the point. There is in Washington an old newspaper correspondent who comes very close to having a mental encyclopedia of all subjects pertaining to

A Royal Road

agriculture and allied industries. A young newspaper man re-

cently said to him, "You must have spent a great deal of time, during all the years, digging into books in the Library of Congress."

"In my 35 years here," replied the old man, "I have never opened a book in the Library of Congress. I happened to find out, right at the beginning, that if I got interested in any subject, there was some man in the Department of Agriculture who knew more about it than had ever been printed on it. I hunted that man out and talked to him--and the system has never failed me yet."

These workers are distributed among numerous bureaus, each of which devotes itself to a special line of work. The work of any bureau is, first, to find out the facts in its field and, second, to communicate those facts to the public. Much of the work, therefore, consists of research and experimentation--experimentation on a scale so extensive and costing so much money and extending through so many years that individuals would be wholly unable to do it for themselves. After the experiments are completed and the facts are established, the information is disseminated in various ways to the public. That is the educational side of the work of the department.

Spreads the Facts

Not every bureau is able to disseminate all the information it

gathers. It has been necessary to establish in the department

what might be called special educational agencies to spread the information gathered by the various bureaus. One of these agencies supervises a force of men and women who go out into all the States and into most of the counties

of those States. The men engaged in this work go with the farmers into their fields, into their stables, into their feeding pens, and teach them first hand how to apply the scientific knowledge assembled by the specialists. The women engaged in the work go into the homes, the kitchens, the sewing rooms, the laundry, and teach the women not only of the farms but of the towns and cities, the best methods of cooking, of canning, of house-
Personal keeping, of the care of children, of buying the food for a
Service family and preparing it for the table. Another one of the special educational agencies prepares information in various forms to be read by the public. Some of this information is in bulletins, circulars, posters, and the like. A great deal of it is in the form of news items, editorials and articles for newspapers, farm journals, trade publications, teachers' periodicals and magazines.

The Department of Agriculture, as it is to-day organized, is made up of the Office of the Secretary, the Office of the Solicitor, the Office of Farm Management, the Weather Bureau, the Forest Service, the Bureau of Animal Industry, the Bureau of Plant Industry, the Bureau of Chemistry, the
The Bureau of Soils, the Bureau of Crop Estimates, the Bureau of
Bureaus Entomology, the Bureau of Biological Survey, the Bureau of Public Roads, the States Relations Service, the Bureau of Markets, the Division of Publications, the Federal Horticultural Board, and the Insecticide and Fungicide Board.

That organization has grown out of a century of work. In an unorganized way, the work dates back practically to the beginning of the Government. In 1836, without any definite authority of law, an agricultural division was established in the Patent Office. In 1839, the first appropriation was made

by Congress--\$1,000 for "collecting and distributing seeds, prosecuting agricultural investigations, and procuring agricultural statistics." When

First the Department of Agriculture was created in 1862, and for some
Funds
\$1,000. time afterwards, its work did not go much beyond managing a propagating garden, collecting and distributing rare seeds, and publishing some agricultural statistics. The Secretary--or Commissioner of Agriculture, as he was then called--personally conducted, practically, all of the work of the department.

As the Department of Agriculture is now organized, the Office of the Secretary looks after matters of general supervision, determines questions of administration and of policy, represents the agricultural interests of the Nation in the President's Cabinet and whenever necessary before Congress. With that office rests the responsibility, largely, of securing legislation and appropriations for maintaining the work of the various bureaus, for expanding that work as the needs require, and for creating new bureaus and inaugurating new activities as the interests of the country demand them.

SOLICITOR LOOKS AFTER MANY LAWS.

The Office of the Solicitor conducts the legal business of the department. The importance of the office is apparent when one remembers that the
Laws of department, through its various bureaus, administers a large
Wide
Range number of Federal laws, including those for the administration of the National Forests, the Federal Aid Road Act, the Food and Drugs Act, the Plant Quarantine Act, the Federal Agricultural School Endowment Laws, the Seed Importation Act, the Federal Meat Inspection Act, the Twenty-Eight Hour Law, the Insecticide Act, the Virus Act, the Migratory Bird

Treaty Act, the Weeks Forestry Law, the Lacey Act, the Bird Reservation Trespass Law, the United States Cotton Futures Act, the United States Grain Standards Act, the United States Warehouse Act, the Standard Container Act, acts regulating the interstate movement of live stock from quarantined

War Acts districts, prohibiting the interstate movement of diseased live
Increased
Work stock, and prohibiting the importation of diseased live stock.

During the war period it administered the Food Production Act and had an important part in the administration of the Food Control Act.

WHAT WEATHER FORECASTING MEANS.

The Weather Bureau is the ranking bureau of the department, though it is not the oldest in continuous service in the department. Its connection with the Department of Agriculture has been a sort of "off agin, on agin, gone agin, Finnigin" proceeding. When the Department of Agriculture was established in 1862, the Smithsonian Institution was making some efforts at gathering meteorological data. The department began publishing these data in its monthly reports. The first Commissioner of Agriculture, Isaac Newton, twice recommended to Congress that "if, under the direction of the Government, the state of the weather at different points of the country could be daily communicated by telegraph, so as to be immediately

Daily spread over the whole country, very important and beneficial
Reports
Asked results might follow." Congress did not act upon the suggestion, but the department continued to publish the Smithsonian data until 1870. In that year pressure from many sources to induce the Government to establish a practical service for the prediction of storms and floods resulted in the organization of a meteorological division in the office

of the Chief Signal Officer of the Army. The weather service was conducted by that office until 1890, when the Weather Bureau as such was officially organized and transferred to the Department of Agriculture.

Put under For thirty years, therefore, the Weather Bureau as now
Agriculture. organized has been not only forecasting the weather for the people of the United States but has done a great deal toward the development of the science of meteorology.

All of us read every day, in the newspaper or on a printed card prominently displayed somewhere, the forecast of what the weather is going to be for the next 24, 36 or 48 hours. Few of us, perhaps, ever stop to think of how the forecasts are made.

The Weather Bureau maintains a staff of observers, stationed at suitable locations all over the United States, on the islands of the oceans, in Alaska. Cooperation is maintained with other observers in Canada and on the ships that ply the seas. Each one of these observers reports the weather conditions by telegraph every day. From these reports of heat and cold, of cloudiness and rain and snow and hail and of wind, the forecasters are enabled to know which way a change in weather is moving, how rapidly it is moving, and when it will arrive at any particular place. Many of these observers are farmers and business men who go about their daily business as the rest of us do, but some of them,

Observers in order to perform their duties, have to face hardships
Face
Hardships that most of us never dream of. Some of them are stationed in wild and lonely places where human society is hardly ever to be found. Others are on little necks of sand running out into the ocean, or on little islands far off the mainland, and they must stay at their posts

even when the terrible gales set them awash with salt waves.

The official forecasters receive the reports of all these observers and, from them, issue their warnings. There is a supervising forecaster Forecaster at Washington. There are district forecasters at Chicago, in Chief Cities. New Orleans, Denver, San Francisco, San Juan, (Porto Rico) and Juneau, (Alaska) There are local forecast officials in the principal cities of the country. Men are assigned to forecast service only after long preliminary training. They must be temperamentally fitted for the work. Their duties are often trying and constantly require intense and undivided attention.

Twice a day, at 9:30 in the morning and at 9:30 in the evening, these forecasters issue their warnings as to general weather, temperature and wind conditions for the various State units. Every Saturday they issue a forecast telling what weather conditions may be expected for a week in advance. At the more important stations, a local forecast is issued every day telling of the general weather conditions, and during the winter months, what the lowest temperature is likely to be. During the months when temperatures are likely to be injurious to shipments of produce and other perishable products, shippers' forecasts are issued. They enable shippers and the railroads to time shipments so that food Issues will not be injured or destroyed by weather conditions. Daily Forecast. Special forecasts are issued from time to time. They include "fire weather" warnings for the forest areas, orchard forecasts for guidance in heating operations to prevent frost injury and of spraying operations, and warnings for various other industries that are dependent on accurate knowledge of weather and temperature changes.

Those are agricultural and commercial forecasts. From the weekly forecast a farmer may know whether it is safe to cut his hay at the beginning of the week or whether it would be better to wait till the last of the week. A produce dealer may know whether it is safe, at a particular time in the early spring, to start a carload of strawberries to a northern market. But the special forecasts reach out beneficially to other classes of people.

The steamship lanes from Atlantic ports to the Newfoundland Banks are watched and daily forecasts are issued. Every day, also, the ships that are out at sea off the Atlantic and Gulf Coast receive by wireless warnings of what weather they may expect. During one autumn, it is estimated, vessels worth more than thirty million dollars would have put to sea in the face of approaching storms and possible disaster but for the warnings of the Weather Bureau. Not even an estimate can be formed, however, of the amount of money that has been saved in this way in all the years that the Bureau has been "on the job." Aviation forecasts are made each day for the aerial mail service of the Post Office Department, for the Army air service and for the Naval air service. The importance of the Weather Bureau to aviation may be judged by the fact that special service was asked for and given in the trans-Atlantic flights of both the American and the British aviators. The big machines "hopped off" only when the Weather Bureau told them that weather conditions along the route were favorable.

Weather Service for Motorists. A highways weather service was recently inaugurated, largely in aid of motor transportation. When it is fully established it will enable people to know in advance the exact condition of the roads

they will have to traverse and to make detours over more favorable roads when necessary.

Water that falls as rain and snow and hail and sleet finally drains into the rivers and runs down to the sea. In times of heavy rainfall a great deal of it runs off speedily, filling the streams beyond their carrying capacity and causing floods. The Weather Bureau knows where the rain has fallen and in what quantities. Its flood service, therefore, prevents tremendous losses in overflows, breaking of levees and the like. It gauges the rivers of the country at important points every day and issues a daily statement of conditions.

There are numerous other activities of the Weather Bureau. At a number of places over the country, it is making free-air investigations with kites and balloons. It is conducting a stupendous enterprise in climatology. It investigates volcanoes, ocean meteorology, the depth and density of the snow cover of high altitudes, and so on.

It was written by a wise man long ago, "He that observeth the wind shall not sow, and he that regardeth the clouds shall not reap." Individual man is inadequate to the task. But the wise one, nowadays, does not sow or reap or ship until he sees what the Weather Bureau has observed of the wind and the clouds.

HOW ANIMAL INDUSTRY IS FOSTERED

Primarily, agriculture concerns itself with two things -- plants and animals. Many factors influence them and tend to make them profitable or unprofitable. All of these factors, of course, require attention from the Department of Agriculture, but in a very important sense, it may be said that the basic bureaus of the Department are

Basic
Bureaus

the Bureau of Animal Industry and the Bureau of Plant Industry.

The animal industry service of the Department had its beginning as a veterinary experiment station. That was in 1878. The disease known as Bureau's pleuro-pneumonia was prevalent at that time, and it may be Beginning in 1878. said that the great Bureau of Animal Industry -- or what was afterwards to be the Bureau of Animal Industry -- was called into existence to combat this disease. Pleuro-pneumonia was stamped out. Since that time the work of the Bureau has branched out into numerous other activities, but the control and eradication of animal diseases has continued to be one of its most important functions. Foot-and-mouth disease has six times invaded the United States, but has as often been driven back across the Atlantic. Rinderpest and various other diseases common in Europe have never been permitted to enter here. Hog cholera used to ravage the farms of the Nation in terrific outbreaks. Many a man, with a snug fortune in pork on the hoof when he went to bed, has arisen in the morning to find the whole herd sick of cholera and has seen his fortune go to feed the buzzards. The Bureau of Animal Industry, through long experimentation, developed a system of administering serum and virus that has made possible the control of this disease. The outbreaks that used to sweep a countryside of all its hogs no longer occur, and the man who takes the trouble to do it, can protect himself from loss by this disease.

Glanders and farcy and dourine, a deadly diseases of horses for which there was no cure, used to be common. They are now reduced to an occasional case. Less than two decades ago sheep scabies was Combats prevalent throughout two-thirds of the United States. It exists Stock today only in small and scattered areas. Nearly the same is true of cattle Diseases

scabies.

The most widespread and destructive animal disease now existing in the United States is tuberculosis of cattle. Not only does it destroy a great deal of property, but it is communicable to human beings. Thousands of people have died of tuberculosis contracted from milk or otherwise from cattle. Tuberculosis is a constant menace to human health and human life. The Bureau of Animal Industry began warfare on it some years ago, and while it is still a common disease, the problem of its final eradication is regarded as solved. Through the accredited herd plan, through prohibiting the shipment of diseased animals in interstate commerce, and by various other means, the Bureau of Animal Industry, with its cooperating agencies, is bringing it under control and pushing it toward final eradication.

There used to be a great mystery about splenetic fever, or Texas fever, in cattle. If cattle from the southern ranges were driven north, while they might not have the fever themselves, they seemed to communicate it to northern cattle. But the transmission was not by any known means. Finally the veterinarians of the Bureau of Animal Industry announced that the disease was transmitted by a tick that the cattle frequently brought with them from the southern ranges. The idea was scoffed at. Medical men used to refer to it as "the romance of pathology." But

Texas
Fever
Traced
to Ticks. the Bureau of Animal Industry men took the ticks and scattered them over pastures where no southern cattle had ever been.

Northern cattle turned on those pastures developed the fever. The contention was proved and finally scientifically explained. The discovery opened up the whole field of insect causation of disease. Not only the

veterinary world, but the medical world accepted it. It led to the discovery of the mosquito as the bearer of malaria and yellow fever. It

Controls has made possible the control of one of the most deadly
Deadly
Mosquito plagues that the human race ever knew and has removed from men's minds the terrible fear that used to be so common when nobody knew when or where a scourge of yellow fever might appear.

The cattle tick occupied a territory extending from Texas to Virginia and appearing again in California. The Bureau of Animal Industry began a war of extermination in 1906. The tick was very promptly eradicated from Tennessee and California. Tick territory was steadily reduced in every State. Two years ago Mississippi completed the task, driving a tick-free wedge to the Gulf of Mexico. Then South Carolina cleaned up, and there was a tick-free lane to the Atlantic. Louisiana is nearly free. Tick territory is much reduced in every State. The areas that have been freed of ticks total 509,084 square miles. The areas still to be freed total only 219,581 square miles, and the specialists in charge predict that the task will be completed in 1923. It will mean -- already means, for that matter -- millions of dollars a year in beef and dairy products.

Along with the efforts to control animal diseases have gone efforts to improve the quality of domestic animals of every kind. Scores of breeding experiments, extending through long periods of years, have
Tries to
Improve
Animals been carried out. A great deal of fundamental knowledge as to breeding has been accumulated. and disseminated to breeders everywhere.

In order to return its owner the largest profit, an animal must be well bred and must be free from disease, but just as important as either, it must be properly fed. The Bureau of Animal Industry has kept scores

of men at work through many years finding out and demonstrating the best feeding methods, the best management methods, and the best utilization methods for all kinds of domestic animals and poultry.

All of those things, of course, benefit the farmer first, but they benefit the city family very substantially. The better the type of animals a farmer keeps, the freer they are from disease, the Better Stock Better Products better fed they are, the better and cheaper is the meat, the eggs, the butter that comes to the city table. But there is another tremendously big activity of the Bureau of Animal Industry that brings its benefits first to the people of the cities.

That activity is Federal meat inspection. Every piece of meat and every can of meat product that goes into interstate commerce has stamped on it the assurance that it is from a healthy animal, that it was prepared in a sanitary slaughter house, and that it is wholesome human food. Every packing plant that does an interstate business must be licensed. Inspectors are placed in it to see that it is kept in a sanitary condition. Every animal that is brought to it for slaughter is inspected by an inspector of the Bureau of Animal Industry. If the animal is diseased, it is condemned and can not be used for human food. All animals are killed under the eye of the inspectors and every carcass is given a post-mortem examination to detect any evidence of disease that might Meat Inspection Thorough have escaped the ante-mortem inspector. Every piece of meat, when it is ready to be shipped out, is stamped by a representative of the Bureau, and that stamp carries with it to the consumer assurance of wholesomeness. Every animal that is brought into the United States and every one that is shipped out is inspected by the Bureau.

This is a bare outline of only a few of the activities of the Bureau of Animal Industry.

PLANT INDUSTRY WAS CORNERSTONE

In a sense, the Bureau of Plant Industry was the cornerstone of the Department of Agriculture, though it was not created as a bureau Bureau with that name until 1901. Long before the agricultural Created division of the Patent Office was established, even, consuls and naval officers abroad were sending home seeds and cuttings for new and rare crops. It was to take care of these, primarily, that the creation of agricultural agencies in the Government was begun. All of the three or four lines of work that constituted the department when it was first created were plant activities.

In 1901 several of the independent offices directly interested in crop production were united and formed the Bureau of Plant Industry. This bureau as it is now organized undertakes investigations relating to crop production of all kinds and varieties of plants, including extensive experimentation upon new crops, by securing crop plants by agricultural explorations and the production of new varieties of crops by breeding, and it studies diseases and methods of controlling diseases affecting these plants. The activities of this bureau are more varied than any other bureau. Although the primary function of this bureau is Chief Aim to aid in the production of good crops by working out better Is Good Crops methods of cultivation and much more satisfactory series of crop rotations, by breeding improved varieties of plants and by establishing methods of plant disease control, it has never discontinued its activities in the particular line of work begun so long ago by consuls

and other Government representatives in foreign lands. The Bureau of Plant Industry brought hardy alfalfas from Siberia and other parts of Asia. It brought the soy bean from the Orient. It has introduced Sudan grass, Rhodes grass, Napier grass, the velvet bean, the purple vetch. It Notable brought from Russia the Durum wheat, the yield of which is Plants Introduced now worth \$50,000,000 a year. It has introduced a dozen other valuable varieties of wheat, oats, barley, and rice. It has brought in a number of varieties of grain sorghums, invaluable to the semi-arid regions of the West. It has introduced scores of fruits. Among the comparatively recent arrivals are the date, the avocado, the mango, the Chinese and Japanese persimmons, the papaya and the Pistache nut. Nearly every country of the globe has been drawn upon for plants that are necessary to meet some need of the American people. "Oh, east is east and west is west, and never the twain shall meet." But when Kipling wrote that he had not visited the plant introduction gardens of the Bureau of Plant Industry.

What has been accomplished by plant introduction, great as it is, must take second place to what the bureau has done in plant breeding and in the establishment of proper methods of culture. The introduced plants were not always just what was needed. American-Egyptian cotton, for instance, represents very much more than merely transplanting a variety of cotton from Egypt to the United States. The American-Egyptian cotton industry in the Southwest is based upon the most careful breeding that has American- ever been undertaken throughout a wide area. Pima cotton, the Egyptian superior type of American-Egyptian for uniformity of grade and Cotton quality, is a creation of the Bureau of Plant Industry, and the field

methods of planting, irrigating, etc., greatly different from those in Egypt, have been worked out so that they are well adapted to the conditions of the Southwest. The list might go on almost endlessly. Almost every department of crop production has received its contribution of valuable varieties from the field and laboratory experiments of the Bureau of Plant Industry.

Better varieties of important crops, wheat, corn, cotton, etc., as well as improved methods of production, improved methods of handling and transpor-

Better tation and more or less satisfactory methods for protection
Crops and
Methods against plant diseases have been established or are being de-
veloped. In addition to these experimental and advisory activities, the bureau undertakes extensive campaigns in cooperation with the States inter-
ested for the prompt eradication or control of plant diseases of particular importance. For example, the bureau is now engaged in cooperation with the States that produce white pine timber in an effort to prevent the spread and reduce the destruction caused by white pine blister rust. In cooperation with the Gulf States the bureau has been for several years combating the citrus canker disease of grapefruit, orange and lime trees, and is approach-
ing the successful completion of this work. During the war a cooperative campaign with all of the wheat-growing States was undertaken to prevent the losses caused by bunt or stinking smut of wheat, and it is now engaged in cooperation with thirteen of the large wheat-growing States in a campaign

Fight for the eradication of the barberry in order to prevent a re-
Against
Diseases currence of such destructive epidemics of black stem rust as,
for example, occurred during the 1916 season when 200,000,000 bushels of wheat were destroyed by this disease.

These things are typical. Similar things have been done for other

kinds of crop plants -- grains, forage plants, fruits, vegetables. Just to furnish an idea of how inclusive the work is, these main divisions of the bureau may be mentioned: laboratory of plant pathology; pathological collections; fruit-disease investigations; investigations in forest pathology; citrus-canker eradication; blister-rust control; cotton, truck and forage crop disease investigations; soil bacteriology and plant nutrition investigations; soil-fertility investigations; acclimatization and adaptation of crop plants; fiber-plant investigations; drug plant and poisonous plant investigations; physiological and fermentation investigations; Studies agricultural technology; biophysical investigations; seed-testing laboratories and enforcement of the seed-importation act; cereal investigations; corn investigations; tobacco investigations; paper-plant investigations; alkali and drought resistant plant investigations; sugar-plant investigations; economic and systematic botany; dry-land agriculture investigations; western irrigation agriculture; horticultural and pomological investigations; foreign seed and plant introduction; forage-crop investigations; demonstrations on reclamation projects; congressional seed distribution.

Since the Bureau of Plant Industry began its work, through the various offices that were finally brought together to form it, more has been learned about crop plants, probably, than had been learned before that An time in all the history of the world. If you did not read the Apt context, you might suspect that Stedman had this work in mind when he wrote: Tribute

"I dare aver
He is a brave discoverer
Of things his elders did not know.
He has more learning than appears
On the scrolls of twice three thousand years."

The Bureau of Plant Industry, along with the others, is always at work helping the farmers of this country to observe the 2,700-year-old, Safe and excellent, advice of Hesiod--"Let it please thee to keep in Farming order a moderate-sized farm, so that thy garner may be full of 2,700 fruits in their season." It, with the other bureaus, has had Years something to do, also, with the other and prettier side of the story, as ago Charles Stuart Caverly once told it in a lilting rhyme:

"The farmer's daughter has soft brown hair
(Butter and eggs and a pound of cheese)
And I met with a ballad, I can't say where,
That wholly consisted of lines like these."

Of course, he may have found it in the Bureau of Plant Industry or, again, he may have found it in--well, say the Bureau of Soils.

SOILS THE SUBSTRUCTURE OF AGRICULTURE

Shakespeare referred to consistency--rather ironically, to be sure--as a jewel. But Emerson calls it "the hobgoblin of little minds." This is a nice thing to remember when you are about to contradict your-
Bureau self. The statement has been made that the Bureau of Animal
Of Soils Industry and the Bureau of Plant Industry constitute the basis of the De-
Started partment of Agriculture, but the soil is certainly the basis of agriculture, and the Bureau of Soils, when you look at it that way, must be the basis of the Department of Agriculture. It began its work in the later eighties as the

Division of Soils in the Weather Bureau. The object then was to gather information in regard to the relation of soils to meteorological conditions. It was established as a bureau in 1894. Since 1900, one of the big items of its work has been a general survey of the soils of the United States. These surveys are made by counties and are so minute as to show variations of soil types even in an area of a few acres. The work already completed covers 517,940 square miles, in addition to which 500,000, located in less thickly populated regions, has been covered by reconnaissance surveys. The survey will not be completed for a great many years yet, but when it is completed every farmer in the United States will know officially just what kinds of soil he has on his farm and what may be expected to grow successfully in them. In the meantime, this information is becoming available Results
Already
Evident to a constantly increasing number of farmers in practically all the States in the Union, and much of the good result originally expected from it is already evident.

But the Bureau of Soils has to do not only with finding out what types of soil there are in given areas, but to all of that important field of agriculture which relates to maintaining the fertility of the soil. It investigates not only the application of fertilizers to the soil, but traces the fertilizers back to their source and is constantly on the lookout for Aids
Potash
Industry new supplies. Before the great war broke out, the United States depended on Germany for practically all the potash it used, and potash is one of the three indispensable elements in fertilizer manufacture. The war cut this country off from that supply of potash, and the country suffered. But no matter what wars or disturbances of any kind may come in the future, the United States will never again be caught in that predicament.

The Bureau of Soils, with such other agencies as were available, have discovered sources of potash in the United States that, though they are not

Making yet sufficient to our needs, may be made so. We are getting
Our Own
Potash potash from a number of lakes in Nebraska and California. The Bureau of Soils on its own account has been manufacturing potash from kelp, the giant seaweed that grows in the waters of the Pacific. More important than either of those sources, the bureau has developed methods of recovering large quantities of potash from the dust that comes out of the stacks at cement factories and blast furnaces. Great quantities of potash are being recovered from this dust that formerly was blown into the air and served no purpose except to obscure the sunlight.

Nitrogen is another of the elements in fertilizer manufacture for which the United States suffered during the world war. Most of the supply had been brought from the natural nitrate deposits in Chile, and the shortage of ships made it impossible to continue to draw nitrogen from that source on reasonable terms. The Bureau of Soils investigated a number of methods of nitrogen fixation, and while some of the ideas were exploded others were proved feasible. It has been proved that the nitrogen of the air can be fixed and applied to fertilizing the soil. The bureau has been at work,

Phosphate too, on a system of manufacturing phosphoric acid by smelting
Supply
Increased phosphate rock and recovering the acid from its gaseous state. On all of the three main elements that go to make up mixed fertilizers, the Bureau of Soils has found a means of increasing the available supply.

INSECTS ARE MAN'S WORST ENEMIES.

The farmer has a great many obstacles to overcome in growing crops and live stock besides the vicissitudes of the weather and the stubbornness of the soil. Certainly the most numerous and probably the most destructive enemies are the insects. The smallest creatures in the visible creation, they are capable of such vast increase and expansion that, uncontrolled, they could exterminate man in a very short time. That queer law that scientists call the balance of nature is responsible, of course, for the largest measure of control, but while this might prevent the insects from destroying man it could not keep them from injuring him very greatly. Man himself has to be constantly on the alert to combat these small enemies, and he needs all the help science can give him. The Bureau of Entomology, therefore, becomes a very important part of the Department of Agriculture. Its work was begun with the appointment of an entomologist only a year after the Department of Agriculture was established. Beginning with a single man, it has grown into a large bureau that specializes on every phase of economic entomology.

It deals with the enormous numbers of different kinds of insects that are injurious to man directly or indirectly, all of the pests of Wares on the grain and forage crops and of the great field crops of the Crop Pests South, such as cotton, tobacco, and rice; also with those which damage fruit and fruit trees, not only the apples, pears, and peaches of the more northern parts of the country, but also the lemons, oranges, and

grapefruits of Florida and California and the Gulf States. It

Other deals also with the insects that are injurious to crops
Destructive
Insects after they have been gathered and stored, with those that damage buildings and lumber and telegraph poles, with those that frequently damage the forests of the Far West to an extent even greater than the destruction caused by forest fires; with insects like roaches and ants that are not only nuisances in the household but are also disease carriers, and with those other more important disease carriers, the house fly and the different species of mosquitoes; and then, too, are studied the insects that are injurious to live stock and poultry. All of the obvious means of destroying insects, by poisoning or by mechanical methods, are investigated in the search for the most economical means. But the bureau goes much further than this; it studies the complete life round of every injurious species of insect, and not only its life round but all of the factors which influence its abundance, and often as the result of this more profound

Devises study some weak point in the insect's economy is found
Means of
Warfare on which is based some simple means of warfare, like a slight variation in agricultural methods, which will put a stop to extreme damage. Among these other means of warfare against injurious insects, the bureau has studied the parasites

and natural enemies of the injurious species, and in the case of several accidentally introduced pests it has found these parasites and natural ene-

Insects mies in their original home and has brought them into the United
Aid
Fight States where they have helped to overcome the injurious forms.

Notable work of this kind has been done in the case of the gipsy moth and the browntail moth.

Among the insects that are beneficial to man, he has domesticated and commonly used only a few--notably the honey bee and the domestic silkworm. The bee has been bred up and improved just as have domestic animals, and is a better honey producer to-day than his remote ancestors. The methods of bee care and keeping have also been greatly improved. The Bureau of Entomology has been active in this work and continues to exert itself along this line.

The domestic silkworm has been the subject of study for a number of years. It has been found that a good quality of silk can be produced anywhere in the United States where the mulberry tree exists or can be grown, and the production of raw silk in the United States is perfectly possible. The economic factor which prevents its commercial accomplishment, however, is the impossibility of competing with the low-priced labor of the Orient.

It is safe to say that more or less competent remedies have been found for nearly all of the injurious insects of the United States which are of

Competent first-class importance, but the effort is constantly to im-
Remedies
Found prove upon these remedies and to render them more effective
and more economical. Work of this kind must be continued for very many years to come, and a constant watch must be kept upon the injurious insects of other countries, lest they be accidentally introduced into the United

States in spite of the fact that, through the Federal Horticultural Board,
Foreign the department has an efficient organization which is quar-
Pests
Kept Out antining this country against many products likely to carry
injurious insects or plant diseases from other regions.

WILD ANIMALS AND BIRDS AFFECT FARMING.

Next to the insects, the farmer's most destructive enemies are the
wild animals, little and big. All the way from the field mice that injure
his field crops and the moles that plow up his garden truck, to the wolves
that prey upon his flocks and the mountain lions that destroy his cattle
and horses, the wild animals are taking toll of the farmer's substance.
But, as is the case with insects, there are bad wild animals and good wild
animals. Many of the four-footed ones are destructive, and most of the
two-footed, feathered ones are beneficial. In order to combat the bad
Protects ones and to use the good ones properly, the farmer needed not
Useful
Animals only direct aid but definite information. These purposes have
been, and continue to be, served by the Bureau of Biological Survey. It
began its work 34 years ago as the Division of Ornithology and Mammalogy.
It did not become a bureau until 1905.

The work of the bureau that appeals most strongly to the romantic in
the average person is the corps of hunters and trappers who spend their
lives outwitting the wild beasts. Mostly they are in the remote corners
of the West, where mountain lions, bobcats, bears, wolves, and coyotes have
been able to maintain their numbers practically undiminished in spite of
the best efforts of the settler and rancher. There are between 400 and 500
of these skilled hunters, and they captured last year about 32,000 predatory
animals, and killed at least that many more by poisoning of opera-

tions. Sometimes one of these hunters will spend perhaps a year trailing a particularly destructive wolf or other animal before it is finally found and destroyed. A mountain lion was killed in Wyoming in the Hunts and destroyed. A mountain lion was killed in Wyoming in the Wild spring of 1919 which was known to have killed \$1,000 worth of Beasts live stock in one month. Another mountain lion had killed 7 colts during the spring. In the same State, a pair of wolves were killed which had destroyed more than \$2,500 worth of stock during the proceeding year. A ranch owner in Texas says that in less than three months he lost nearly 300 sheep, worth \$3,200, through depredations of six coyotes, which later were killed by Government hunters. There is an area about 75 miles in diameter in Colorado where sheep owners used to report a loss of about 25 sheep a day throughout the season. The destruction of predatory animals has been so thorough that sheep now range freely and unattended without loss.

The destructiveness of an animal is not in proportion to its size. The little animals destroy a great deal more property than the big ones. Prairie dogs, pocket gophers, ground squirrels, rabbits, rats and mice, mountail beavers, and woodchucks take every year a much larger toll of the farmer's produce than do the bears, wolves, mountain lions, bobcats, and the other large animals. Prairie dogs alone occupy more than one hundred Small million acres of public and private lands, and where they Destructive occur in large numbers on the open range they are exceedingly Animals destructive to cultivated crops and forage. The other rodents are only a little less widespread and some of them are not less destructive than prairie dogs. The Biological Survey has greatly reduced the numbers of these pests over a wide area, with the result that agriculture has been made profitable in many regions where it was formerly a precarious occupation.

The ground squirrel is not only a pest to agriculture but a menace to human health as well. It is a carrier of the deadly spotted fever in Ground Squirrel A Menace Montana, and of the bubonic plague in California. Extermination of ground squirrels, which is being carried out on a great scale following methods developed by the Biological Survey, will save enormous losses in crops and forage and prevent the spread of these deadly contagious diseases.

House rats and mice are as serious a menace to stored farm products as are the other rodents to the growing crops in the fields. The Biological Survey is constantly working toward the extermination of rats and mice, and has saved the Nation many millions of dollars in this way. In addition to the great economic saving that has been effected, human health has been materially benefited. The rat is the carrier of bubonic plague, one of the most deadly and loathsome of human diseases. The control of the disease is effected now through the extermination of rats.

The Biological Survey has done another important work for human health in its control operations against predatory animals. For a number of years rabies has been prevalent among the predatory animals in California, Idaho, Nevada, Oregon, Washington, and Utah. As an indication of how serious Rabies Outbreak Costly the losses from this cause once were, it is estimated that a single outbreak in Nevada in 1915-16 killed live stock worth half a million dollars. Some ranches lost from 200 to 400 head of cattle. Up to the present time approximately 1,500 persons are known to have been bitten by rabid wild animals, and at least 47 of those attacked are known to have died. Without Federal intervention, the ravages brought about by rabies

would have been greatly increased. The disease still maintains a foothold in all of those States, but efforts to suppress its carriers have been Disease so successful that its spread to other States has been prevented, Checked and the number of domestic animals and persons bitten by rabid wild animals has steadily decreased until at present it is very small. When an outbreak of the disease occurs in any district, hunters are immediately concentrated there so that the wild animals carrying the rabies are speedily destroyed and the spread of the disease is stopped.

The Biological Survey enforces the Migratory-Bird Treaty Act, which is an agreement between the United States and Great Britain for the protection of all birds that make the pilgrimage every year from the Tropics to the north and back again to the warmer climates in winter. This includes a large part of the species of birds on the North American Continent. The beneficial effects of this work are already apparent in the notable increase of wild fowl and other useful species, and from the fact that a number of more or less rare species are again appearing in haunts from which they have been absent for many years.

A great deal of work has been done by the Biological Survey to determine the economic status of the various species of birds--that is, to find out whether they are beneficial in their general habits or destructive. It is Studies definitely known that a great majority of our birds are ben- Bird Habits eficial, but some of them have destructive habits, and now that the whole bird tribe is protected by the British-American Treaty, the Government is in position to devote more attention to finding out the bad traits of the few injurious species and to devising means for combating them.

The bird and mammal reservations of the Nation are in charge of the Biological Survey. There are four big game preserves and 69 bird reservations. The latter are scattered pretty well over the country and a number of them are on the islands of the surrounding waters, one of them being in mid-Pacific, 1,000 miles beyond Honolulu. The mammal reservations are the Winter Elk Refuge, at Jackson, Wyo.; the National Bison Range, near Dixon, Mont.; the Wind Cave National Game Preserve in South Dakota; and Sullys Hill Game Preserve, in North Dakota. The Niobrara Reservation in Nebraska is used both for birds and big game animals. On these reservations the Biological Survey is taking care of and increasing many species both of birds and animals that shortly would become extinct or nearly so but for this Governmental protection.

FOREST SERVICE PROTECTS POSTERITY.

It is pretty hard to arrange the bureaus of the Department of Agriculture in any particular sequence, but it is natural to pass from birds and animals to forests. The forestry work of the department began in 1876 under authority of legislation which had its origin in a memorial submitted to Congress by the committee of the American Association for the Advancement of Science in 1874. In 1881 the work was organized as a division of the department, and in 1901 as a bureau. This has been known as the Forest Service since 1905, when the National Forests were transferred from the General Land Office to the Department of Agriculture.

The Forest Service gives practical assistance regarding the management, reproduction, and use of public and private forests. It works out

methods of handling and developing all woodland resources, including forage and game, and of protecting them against forest fires and other destructive agencies. It investigates and puts into practice cutting Protects Forests methods by which the forest is regenerated and which result in the production of sustained supplies of timber. It studies the best methods of growing tree seedlings and of planting forests, determines the kinds of trees which can best be grown in different places, and gives practical assistance to tree planters.

The Forest Products Laboratory at Madison, Wis., is maintained by the Forest Service for the purpose of making technical studies of forest products. Here are studied the strength and durability of all forms of wood, the uses to which various kinds of wood are best adapted, the best methods of wood seasoning, conditioning, and preservation, improved processes of manufacturing pulp, paper, and other products of wood, and many other matters. At experiment stations in various parts of the West investigations are made of the life history of various types of forests, of the effects of climatic Tree Growth Studied conditions, fire, grazing, and other factors on tree growth, and of the methods by which the forests can best be perpetuated. Studies are also made and practical advice given regarding the proper handling of live stock on the open range, of the effects of over-grazing, and other matters relating to the use of the forage resources on public and private land.

The biggest single thing done by the Forest Service, of course, is the administration of the National Forests. These Forests now include over

150,000,000 acres. The Forest Service believes that, if the timber supply of the Nation is to be at all adequate for future generations, this area Administers must be largely increased and that the States must be en-
National
Forests couraged to establish additional forests under State control. Even this, it is believed, will not be sufficient for future needs, and a far-reaching public policy of forest conservation is their land's waste, while extending to them public aid along various lines. The National Forests furnish a considerable amount of pasturage in addition to the wood products they supply, and millions of cattle, sheep, and horses are grazed during the summer on the mountain ranges of the forests. This grazing is under the direct supervision of the Forest Service.

The National Forests include also a large percentage of the undeveloped water power of the United States. This is available for development under regulations designed to protect the public interest. The regulating effect of a forest cover at the headwaters of streams used for irrigation, water power, and navigation is so important and so well recognized that it was responsible for the creation of many of the National
Vital to Forests of the West, and led to the adoption by the Govern-
Water
Power ment of the policy of purchasing lands in the eastern mountains for inclusion within the National Forests.

There is a variety in the work of the Forest Service which is found in no other bureau. It ranges all the way from a careful study of minute

wood cells so small that they are visible only by the aid of a high-powered microscope to the handling of vast areas of mountain lands where things are still in the rough. But it all has the definite purpose of bringing about the most efficient and economical perpetuation and use of the public and private forests.

HOW BUREAU OF CHEMISTRY SERVES NATION.

The Bureau of Chemistry is one of the large and important bureaus of the Department of Agriculture. Perhaps you wonder why chemistry should be a part of agriculture. Well, other people have wondered before you. In 1862, a few months after the Department of Agriculture was established, the Commissioner proposed to employ a chemist. Some inquisitive Congressmen wanted to know what there was for such an official to do in the Department of Agriculture. The Commissioner replied that in the experiments with new varieties of grapes there were analyses which could be made with profit. It is funny now to compare that effort at justification with what the Bureau of Chemistry has done and what it is constantly doing. It made those analyses of grapes during the first year of its existence and it also did

Why a something that year with sorghum sirups, then but newly intro-
Chemist
Was duced by the plant scouts. It has kept right along through the
Needed fifty years doing things with sirups. It has been very busy with them during the past year or so.

The sugar and sirup experts of the bureau recently accumulated a considerable quantity of a sugar so rare that, though it had been known to chemists for a long time, had never been found in sufficient quantities to

permit even of experiments. It is suspected of being one of the elements
A Rare of the manna on which the children of Israel fed during their
Sugar
Found forty years of wandering in the wilderness. It has always been
found in minute quantities on certain trees of that region. It has also
been found in minute quantities on melez or larch trees in France, and from
that it took its name of melezitose.

Well, there came a report to the Department of Agriculture a little
while ago that the bees in certain sections of Pennsylvania were dying be-
cause their honey crystalized and they could not eat it. The Bureau of
Chemistry investigated and found that these honey combs were full of the
very rare sugar, melezitose. Then the discovery was made that these bees
had been feeding on honey dew on the pine trees, and that led to the discov-
ery that this particular honey dew was secreted by some very small insects.
At last, the world has enough melezitose to enable the chemists to find out
what it really is and the uses to which it may be applied. Evidently, the
Pennsylvania bees afford a fairly constant source of supply of this sugar.

That particular achievement may not be of very large practical impor-
tance, but it is interesting and it shows something of the range of work
that the bureau has done with sirups and sugars. At the same time, the sugar
and sirup experts have been at work on the production of a uniform cane sirup
that will neither ferment nor crystalize.

It is not possible to take up in any detail all of the lines of work
done by the Bureau of Chemistry. A book could be written--and will be, doubt-
Important less--on what was done in the way of developing American dyes when
War
Work the German supplies were cut off by the war. A whole library
could be written on what the bureau has done on foods. Most of the flour-

saving methods practiced during the war were the result of substitutes worked out by the Bureau of Chemistry. It has done a great deal of useful work on

Making fats and oils, on sea foods, on poultry and eggs, on dairy
A Dollar
"Stretch" products, beverages, citrus by-products, flour and cereals, and possibly most important of all, on the drying of fruits and vegetables. It has not stopped with foods, either. Raiment, the next most important thing for human beings, has received a large measure of attention. The work with fabrics and paper, with leather, etc., has resulted in the development of methods that will stretch a dollar over a much more liberal portion of the human frame than it could formerly be made to cover.

There used to be, every now and then, a mysterious explosion in a grain elevator or a mill. A great deal of property was destroyed and many lives were lost. The Bureau of Chemistry discovered that they were explosions of grain dust and it began a crusade of prevention, largely by supervision and education. For a year and a half after that crusade was begun, there was not a single explosion that resulted in the loss of human life and none in which the property loss amounted to much. Congress did not make any appropriation for the continuance of the work during this fiscal year. There have been some disastrous explosions during the past six months. However, the work is being carried forward to some extent with funds provided by the United States Grain Corporation. Whether money will be made available for its continuance in other years remains to be seen. The educational work, Explosion however, has produced results that will be lasting. Grain dust
Mystery
Solved explosions are not likely ever again to be so frequent as they formerly were. The same sort of thing has been done with regard to explosions in cotton gins and around grain separators.

Probably the biggest single duty performed by the Bureau of Chemistry is in enforcing what is known as the "pure food" law, officially referred to as the Federal Food and Drugs Act. It operates as a protection to the public, an insurance of purity to the public, not only on foods but on patent medicines, crude drugs and pharmaceuticals, mineral waters, etc. Under the terms of the law, a manufacturer can not make a false or misleading statement on the label of his product. The purchaser has the means of knowing exactly what he is buying. This applies not only to ingredients but to weights. If a bottle of catsup or a tin of pepper is labeled to contain eight ounces, it must not contain any less quantity than that.

Most of the bureaus mentioned devote themselves primarily to the production of farm products--either directly to that or to things bearing upon it. Put the growing of crops and the raising of live stock do not make up the business of farming. Unless the farmer can sell his products at a profit, he is not making a success of the business. Marketing has been referred to as "the other half of farming"--and it is the half that is receiving, just now, a great deal more attention than it formerly received.

There are three bureaus in the Department of Agriculture that are concerned largely with "the other half of farming." They are the Bureau of Markets, the Bureau of Crop Estimates and the Office of Farm Management. All except the first have a bearing on production also, but their largest usefulness is, perhaps, in aiding proper distribution and marketing.

Crop Estimates Aid Producer and Consumer
CROP ESTIMATES AID PRODUCER AND CONSUMER.

The Bureau of Crop Estimates, in a way, is the oldest bureau in the department. The first appropriation was largely for the gathering of agricul-

tural statistics. The work has gone under various names at different periods and has been known as the Bureau of Crop Estimates only since 1914,

Bureau's but the work itself has remained basically the same, though it
Origin--
Interesting was expanded tremendously.
Story

The story of how this bureau works is one of the most interesting in the Government. The bureau maintains a field agent in each State or group of similar States. Each field agent supervises the work of gathering statistics for his territory. There are 39 of these field agents. Then there are 12 crop specialists. Each specialist devotes himself to some one crop or group of crops and is not confined by State lines. The specialist on tobacco, for instance, gathers statistics for that crop over the entire country.

But the big staff of gatherers of statistics is made up of voluntary crop reporters. There are 216,000 of these voluntary reporters, including county, township, and special. Every community in the United States where crops are grown is covered by these men.

Each of these men--the field agents, the crop specialists and the voluntary reporters--makes his report independently each month. He gives figures for acreage and condition as compared with previous years. The reports of field agents and specialists are addressed to the Secretary of Agriculture. When they reach the Office of the Secretary, they are placed in a locked box to which only the Secretary or the Acting Secretary has the key. There the reports remain until the morning of crop reporting day.

"Behind On that morning, the crop reporting board goes into a spe-
Locked
Doors" cial room. The reports are placed on a table by the Secretary or his representative. Then the door of the room is locked, all telephones

are disconnected, and the room is so arranged that there is no possibility of anyone inside the room making signals to anyone on the outside. The board is made up of seven men--five experts in the Bureau of Crop Estimates and two field men called in for the occasion. These men consider the re-
Final ports made by the reporters, the field agents and the crop spe-
Estimate
Accurate cialists and each of the seven, independently of the six others, makes his estimate of the condition of the various crops for the country as a whole. Then the five separate estimates are compared, and a single estimate made from them. Ordinarily, the seven estimates are so close together that there is no difficulty about bringing them into accord. The final estimate is always very accurate. For several years, for instance, the preliminary reports on cotton came within less than 1 per cent of final production, as checked up after the crop was picked, ginned, and baled.

While the board is in session upstairs, newspaper reporters are gathering in a room arranged for them on the floor below. Each reporter has a telephone already connected with the office of his newspaper or press association. When ^{the} estimate is finished, it is signed by the Secretary. Then mimeographed copies of it are brought to the newspaper room and placed face down on a table. Each reporter places his hand on a copy of the report and, bent like a runner ready for the start of a 50-yard dash, waits for the signal of release. When this is given by the Secretary, each reporter dashes to the telephone and within a minute or two the figures are flashing over the wires to all parts of the country.

The necessity for guarding the reports so strictly is that advance in-
"Leaks" formation of what the estimate will be would enable speculators
Guarded
Against to take advantage of the knowledge and manipulate the markets to the detriment of the public. Several years ago this information did get out

in advance. An investigation was made, and it was discovered that the man who received it was standing at least a hundred yards from the building in The Story Of One Leak which the crop reporting board met. The information was conveyed to him by one of the men inside the room with signals made by raising and lowering a window shade. All members of the crop reporting board are now subject to fine and imprisonment for giving out any information in advance of the official release, for speculating in any crop, or for knowingly compiling or issuing any false statistics.

The chief value of this work lies in the accuracy, timeliness, and disinterestedness of the information it furnishes both to farmers and marketing agencies throughout the country. It lessens speculation, because speculation thrives on lack of public information, doubt, and uncertainty. It tends to prevent the issuance of false and misleading statements by speculators and profiteers. It enables farmers to know when and where to sell and it aids them materially in deciding what acreage they will plant in a given crop in any particular year. For instance, if a potato grower in Maine knows that the potato crop on the South Atlantic Coast is going to be decidedly short, he is justified in changing his plans to include a larger acreage of potatoes than he would ordinarily plant.

FARM MANAGEMENT WORK EXPANDING.

The Office of Farm Management is designed to help the farmer solve his economic problems. It deals with the choice of crops and live stock, and the choice of labor and equipments, with a view to efficiency in production and a permanently satisfactory profit.

The special lines of work which are being carried on are--the investigation of the cost of producing the principal farm products, farm business analyses looking to the more efficient organization of the farm, and studies Special in land tenure, land ownership, and land values. Attention is Lines of being given to the farm labor problem, the problems of agricultural credit and insurance, and to living conditions on the farm.

The investigations of this Office will provide the facts essential to a clear understanding of the farm problem which centers about costs and prices, both on the part of the farmers themselves and all other classes who are interested in the progress of agriculture.

BUREAU OF MARKETS REACHES EVERY HOME.

Another new development is the Bureau of Markets, established in 1913, and already grown to be one of the large bureaus of the department. Every bureau in the department either directly or indirectly confers considerable benefits on the consumer as well as the producer of farm products, but the Bureau of Markets perhaps comes nearer than any of the others to dividing its benefits equally between the two classes.

It studies the problems of retailing foods in cities so that lost motion, wastes, and unnecessary costs of operation can be located and eliminated and any promising improvements in distribution may be brought into more general use. It surveys cities to determine whether marketing and retailing methods in such cities are efficient, and advises municipalities in regard to the establishment and operation of public markets.

Publishes It also assists communities in the establishment of city Market market reporting services which keep consumers informed of market News conditions in order that the consumption of abundant products may be

facilitated. All this work closely concerns consumers. The bureau also operates great nation-wide market news services for the benefit of car-lot shippers. There are such market news services on fruits and vegetables, Inspects on live stock and meats, on dairy and poultry products, on cotton, Food Products on hay and feed and on seed. Each of them facilitates the relationships between producer and consumer. The bureau maintains a food products inspection service on fruits, vegetables, and butter in nearly 200 cities in all. Receivers in the markets where inspection is maintained avail themselves of it very generally, shippers in all parts of the country are availing themselves of it with increasing frequency, and the railroads are making use of it generally to secure an inspection certificate on each lot of fruits and vegetables the quality of which may be in doubt. The bureau gives assistance to emergency traffic and storage of food products, and to the preservation of fruits and vegetables in transit and storage. It is establishing market grades and standards for fruits and vegetables. It assists in matters of cooperative purchasing and marketing, in the direct marketing activities in which the consumer buys directly from the farmer, in foreign marketing of agricultural products, in improved business practices for marketing organizations and in motor transportation of farm products. In a large way, it concerns itself with grain standardization and handling and transportation, cotton handling, and marketing, marketing Other cotton seed and its products, the determination of cotton stand- Important Functions ards, and the supervision of stockyards and live stock dealers. It enforces the United States Grain Standards Act, the Cotton Futures Act, the Warehouse Act, and the Standard Container Act. Generally speaking, it is engaged in all the lines of work that will make easier and more economical

the distribution of products from the farmer to the consumer.

ROADS USED BY CITY AND COUNTRY.

Now, the various things we have talked about may appear to cover all that is necessary to success in farming. We began with the weather, the

Good one thing that the farmer can't make or have made for him but
Roads--
Cheaper which he may somewhat guard against if he knows about it in
Food advance. We have talked about soils--the basis of all agri-
culture; about plant industry, animal industry, insects and animals in their
relation to agriculture, chemistry, crop estimates, management and markets.
But, though a farmer have all these things he can hardly do a profitable
business and certainly he can not lead a comfortable life unless good roads
connect his farm with other farms and with the community center and with
a market town. The Bureau of Public Roads deals with this part of the
problem. This bureau, too, serves the city as well as the country. Good
roads over which products are hauled to market make those products cheaper
to the family that eats them. They mean as much in profits to the city man
as to the country man, and probably they mean more in pleasure. The city
family's automobile would lose the greater part of its worth as a giver of
recreation if there were no country roads for it to run over.

The Bureau of Public Roads administers the Federal Aid Road Act and
has available \$294,000,000 of Federal money for expenditure in road con-
struction under existing appropriations. The department is working in co-
operation with the States toward the development of a country-wide system

Aids of good roads that will best serve the needs of all the people.

Road
Building In addition to supervising road construction under this law, the
Bureau of Public Roads conducts fundamental investigations of road-building

problems--to determine, for instance, the relative values of road-building materials and methods of construction, best methods of maintenance and repair, etc., and is now making a very careful study of the problems of administration and financing which will be of the greatest concern in the years of highway development that lie ahead. These are problems which concern every taxpayer.

Designs
Farm
Houses

In the Bureau of Public Roads there is a division which designs plans for farm homes and plans sanitary supplies, sewerage systems and small lighting plants, a division which is assisting the farmers in draining wet lands, and a division which is studying the problems of production of agricultural products on irrigated lands.

STATES RELATIONS SERVICE DISSEMINATES INFORMATION.

All the bureaus and offices that we have discussed are engaged primarily in finding out things that will be helpful to farmers and, therefore, beneficial to the whole country, since all people are dependent upon the farmer for the necessities of life. But all the information gathered by all the bureaus is practically worthless unless it actually reaches the farmer and the farmer's wife and is used by them. Another large bureau, the States Relations Service, devotes itself largely to the dissemination of the knowledge gathered by the other bureaus. The two offices of extension work, one for the South and the other for the North and West, undertake, in cooperation with the agricultural colleges and farm bureaus, to carry the information direct to the farmer in his field or feeding lot, to the farm woman

County
and Home
Agents

in her kitchen or sewing room. A great number of men and women are employed to give this instruction. The purpose is to have a man and a woman in every county. The ideal has not yet been attained, but there are men agents in about two-thirds of the counties and women agents

in nearly one-third. The men are styled farm demonstration agents, or more commonly county agents. The women are called home demonstration agents. The county agent lives in the county that he serves and spends his time with the farmers. He is a practical and scientific farmer. Whatever knowledge A Walking the department and the State colleges of agriculture have gather-
College
Faculty ed, he is prepared to give directly to the farmer. He carries an entire agricultural college faculty under his hat. He teaches everything from complex cultural and feeding methods to the proper way of tying a knot in a rope to keep it from slipping or to allow it to slip, as the case may require. The home demonstration agent does for the farm woman exactly what the county agent does for the farmer. She teaches the best methods of cooking, of serving, of housekeeping, of making and caring for the clothes of the family, of preparing the children's school lunches, of canning, preserving, pickling, drying and otherwise conserving the products of garden and orchard. All the problems that the farm woman has to grapple with the home demonstration agent helps her solve. In many counties there are also extension agents giving practical instruction to farm boys and girls organized in corn clubs, pig clubs, canning clubs, etc.

There are other branches of the States Relations Service. It is the connecting link between the Department of Agriculture and the State agricultural colleges and experiment stations. There is an office devoted exclusively to promoting the interests of the agricultural experiment stations, Home and managing stations in Alaska, Hawaii, Porto Rico, Guam, and
Economics
Office the Virgin Islands. The service also furnishes agricultural schools and farmers' institutes useful information and lantern slides. There is an office of home economics, devoted wholly to investigations of foods, clothing, household equipment and management.

PUBLICATIONS COVER FARMING AND HOME MAKING.

There is still another important means of disseminating the information gathered by the department. The county agent and the home demonstration agents teach principally by the spoken word. The Division of Publications teaches by the printed word. The Division of Publications Publishes Farmers' Bulletins has published more than a thousand farmers' bulletins, and practically every subject pertaining to farming and farm life has been treated in popular language. Lists of these bulletins are distributed, and any person who is interested may have copies of the bulletins free on request. The supply of some few of the bulletins has become so nearly exhausted that they can no longer be distributed free, but they can be bought at a very low price from the Superintendent of Documents, Government Printing Office. In addition to the farmers' bulletins, there have been issued more than 800 department bulletins. These are more technical than the farmers' bulletins and are not intended for general distribution. They are available, however, at small cost to interested persons. A great many briefer papers have been issued as circulars, leaflets, and the like.

Motion pictures are made of a great many matters of interest not only to farmers and farmers' families but to the general public. Some of these motion pictures are meant primarily for use at farmers' institutes and similar gatherings but others of them are distributed to regular motion picture houses over the country and are seen by millions of city people.

Motion Picture Activities Through exhibits many of the activities of the department are shown at State and county fairs and at various other kinds of expositions and gatherings.

This covers the main activities of the United States Department of
Much More Agriculture. There are some other divisions, offices and boards
Could
Be Told of which very interesting things might be said if time permitted.
The Federal Horticultural Board, for instance, guards the agricultural in-
terests of the country against attack by foreign insect and other enemies
of plants. It is given authority under the law to promulgate plant quaran-
tines, either domestic or foreign, and some 30 such quarantines are now be-
ing enforced. Some of them are designed to prevent the spread of injurious
insects or plant diseases already established in limited sections of the
country. Others are for the purpose of preventing injurious insects from
entering the United States from foreign countries. Another agency is the
Insecticide and Fungicide Board.

It has been conservatively estimated that the annual losses of plant
products from insect pests and diseases, and the annual shrinkage in stock
values from insect pests, is in excess of \$1,500,000,000. A large part of
this loss can be avoided by the use of high-grade insecticides and fungi-
cides which will do what is claimed for them on the labels, and at the same
time will not injure plants or animals. It is the duty of the Insecticide
and Fungicide Board, acting under the provisions of the Insecticide Act, to
inspect, analyze and test insecticides and fungicides to be sure they are
of a high grade and will do all that is claimed for them, and if not, prose-
cute the shipper or seize his goods. The activities of this Board have very
far-reaching effect. When it is considered that all food-producing crops,
Tests all food-producing animals and the great cotton and tobacco
Insect
Killers crops are all subject to the ravages of destructive insects and
diseases, and that growers are dependent to a large extent for their control

upon the proper use of insecticides and fungicides, it will be realized that the enforcement of this law affects every individual in the Nation. The disinfectants and insecticides used in homes and public places are also subject to the provisions of this law.

At And that finishes the picture. It is not complete, though.
Your
Service Only the principal objects have been sketched in. It is a subject that anyone might go deeper into with profit. The Department of Agriculture is paid for by the people of the country to serve the people of the country. The department is doing its part. Are you doing yours? The Department of Agriculture, with all it contains and all it has discovered, is there for you. Use it.

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